

In the Claims:

Please amend the claims as follows:

1. (currently amended) A method of tuning an arc welding system comprising an electric circuit including a power source, and a control system including a computer means and a memory means, the method comprising:

determining values of system input parameters of the electric circuit and feeding the system input parameters to a simulation model of the arc welding system;

calculating tuning parameter values ~~from these~~ based on the system input parameters by ~~using a~~ using the simulation model of the arc welding system; and

tuning the arc welding system by implementing the tuning parameter values into the control system,

wherein the simulation model is calibrated to represent the actual welding situation by measurement of the model parameter values on ~~the~~ a welding station on site.

2. (previously amended) A method according to claim 1, wherein the calibration comprises a first calibration mode comprising:

short-circuiting the electric circuit over the arc;

sending a controllable current and voltage through the system; and

measuring the resistances and the inductances of the electric circuit.

3. (previously amended) A method according to claim 1, wherein the calibration

comprises a second calibration mode comprising:

- empowering the welding station with full power to produce an arc;
- measuring the current and the voltage of the electric circuit; and
- adjusting the model so that predicted values match the measured values.

4. (previously amended) A method according to claim 1, wherein the calibration comprises a third calibration mode comprising:

- empowering the welding station with full power to produce an arc;
- performing a plurality of process modes by the control unit; and
- extracting the characteristic fingerprint pattern of the power source from measurement of current and voltage under each of the performed process modes.

5. (previously amended) A method according to claim 1, wherein the simulation model is brought to comprise a model component of the metal transport between the electrode and the workpiece, the metal transport model is brought to comprise a first model part of a region close to the wire, a second model part of the arc column, and a third model part of the metal condensing in the region close to the workpiece, the simulation model further comprising a model part of the power source used to generate the metal transport, and a model part of the electrical circuit connecting the wire, the arc column, and the workpiece and the power source together.

6-9 (cancelled)

10. (withdrawn) A computer program product comprising  
a computer readable medium; and  
computer program instructions recorded on the computer readable medium and  
executable by a processor to perform a method of tuning an arc welding system comprising an  
electric circuit including a power source, and a control system including computer means and  
memory means, the method comprising determining values of system input parameters of the  
electric circuit, calculating tuning parameter values from these system input parameters by using  
a simulation model of the arc welding system, and tuning the arc welding system by  
implementing the tuning parameter values into the control system, wherein the simulation model  
is calibrated to represent the actual welding situation by measurement of model parameter values  
on the welding station on site .

11. (withdrawn) The computer program product according to claim 10 provided at least  
in part over a network.

12. (withdrawn) The computer program product according to claim 11, wherein the  
network comprises the internet.

13. (currently amended) The method according to claim 1, wherein the simulation  
model comprises ~~means for calibrating~~ a calibration unit configured to calibrate the simulation  
model, an input unit configured to receive ~~input means for receiving~~ measured model parameter  
values, a calculation unit configured to calculate ~~means for calculating~~ tuning parameter values,  
and an implementing unit configured to implement ~~means for implementing~~ the parameter values

into a control system of a robotic arc-welding station representative of the simulation model.

14. (previously presented) The method according to claim 5, wherein the model parameters of the electric circuit comprise inductance and resistance of a first electric path, inductance and resistance of a second electric path, current and voltage of a process mode, and a correspondent behavior of the power source.

15. (new) The method according to claim 1, wherein the simulation model comprises parameter values for properties related to the power source, a wire, a workpiece, a weld profile and metal transfer between the wire and the workpiece.